

CLAIMS

1. A flame retardant polymer composition comprising a polymer and a
5 particulate clay mineral distributed in the polymer composition at a particle number per unit volume of at least about 1 particle per $100 \mu\text{m}^3$, provided that the clay mineral present at the said particle number per unit volume is not an organomontmorillonite.
- 10 2. A composition according to claim 1, wherein the particle number per unit volume in the polymer composition is at least about 10 particles per $100 \mu\text{m}^3$.
3. A composition according to claim 1 or 2, wherein the clay mineral comprises a hydrous kaolin.
- 15 4. A composition according to claim 1 or 2, wherein the clay mineral comprises a partially calcined kaolin.
5. A composition according to claim 1 or 2, wherein the clay mineral comprises a
20 fully calcined kaolin.
6. A composition according to claim 1 or 2, wherein the clay mineral comprises a talc.
- 25 7. A composition according to claim 1 or 2, wherein the clay mineral is any combination of a hydrous kaolin, partially calcined kaolin, a fully calcined kaolin and a talc.
8. A composition according to any one of claims 3 to 5, wherein the particulate
30 kaolin clay has a mean equivalent particle diameter less than or equal to about $4 \mu\text{m}$ and a particle shape factor which is greater than about 10.

9. A flame retardant polymer composition comprising a polymer and a particulate kaolin clay having a mean equivalent particle diameter less than or equal to about 4 μm and a particle shape factor which is greater than about 10.
- 5 10. A composition according to claim 8 or claim 9, wherein the mean equivalent particle diameter is less than or equal to about 3 μm .
11. A composition according to any one of claims 8 to 10, wherein the mean equivalent particle diameter is between about 0.1 and about 2 μm .
- 10 12. A composition according to any one of claims 8 to 10, wherein the mean equivalent particle diameter is between about 0.5 and about 2 μm .
13. A composition according to any one of claims 8 to 10, wherein the mean
- 15 equivalent particle diameter is between about 0.5 and about 1.5 μm .
14. A composition according to any one of claims 8 to 13, wherein the shape factor is between about 10 and about 150.
- 20 15. A composition according to any one of claims 8 to 13, wherein the shape factor is greater than about 30.
16. A composition according to claim 15, wherein the shape factor is up to about 150.
- 25 17. A composition according to any one of the preceding claims, further including one or more additional flame retardant component.
18. A composition according to any one of claims 1 to 16, further including one or
- 30 more non-kaolin flame retardant component.
19. A composition according to claim 17 or claim 18, wherein the flame retardant component is selected from phosphorus-containing compounds, boron-containing

compounds, metal salts, metal hydroxides, metal oxides, hydrates thereof, organoclays (including ion-exchanged and any other modified organoclays), halogenated hydrocarbons, and any combination thereof.

5 20. A composition according to claim 19, wherein the flame retardant component comprises alumina trihydrate (ATH), boric acid, a metal borate or a combination thereof.

10 21. A composition according to claim 18, 19 or 20, wherein the particulate clay mineral or particulate kaolin clay is present in an amount of at least about 50% of the total weight of particulate clay mineral or particulate kaolin clay and flame retardant component.

15 22. A composition according to any one of the preceding claims, wherein the polymer comprises a thermoplastic polymer.

23. A composition according to any one of claims 1 to 21, wherein the polymer comprises a thermoset polymer.

20 24. A composition according to any one of claims 1 to 21, wherein the polymer is selected from polyolefins, polycarbonate, polystyrene, polyester, acrylonitrile-butadiene-styrene copolymer, nylons, polyurethane, ethylene-vinylacetate polymers, and any mixture thereof.

25 25. A composition according to claim 24, wherein the polyolefin comprises polyethylene or polypropylene.

26. A composition according to any of the preceding claims, further comprising a silane.

30 27. A particulate filler material for a flame retardant polymer composition, the filler material comprising a particulate non-kaolin flame retardant and a particulate kaolin clay, wherein the particulate kaolin clay has a mean equivalent particle

diameter less than or equal to about 4 μm and a particle shape factor which is greater than about 10.

28. A particulate filler material according to claim 27, wherein the shape factor is
5 greater than about 30.

29. A particulate filler material according to claim 27 or claim 28, wherein the
non-kaolin flame retardant component is selected from phosphorus-containing
compounds, boron-containing compounds, metal salts, metal hydroxides, metal
10 oxides, hydrates thereof, organoclays (including ion-exchanged and any other
modified organoclays), halogenated hydrocarbons, and any combination thereof.

30. A particulate filler material according to any one of claims 27 to claim 29,
which consists essentially of ATH and the particulate kaolin, and optionally one or
15 more other non-kaolin flame retardant component, with less than about 10% by
weight of other component(s).

31. A particulate filler material according to any one of claims 27 to 30, wherein
the particulate kaolin is as defined in any one of claims 3 to 6 and 8 to 16.

20 32. A particulate filler material for a flame retardant polymer composition, the
filler material comprising a particulate non-clay mineral flame retardant and a
particulate non-kaolin clay mineral, wherein the particulate non-kaolin clay mineral
has a mean equivalent particle diameter less than or equal to about 4 μm and a particle
25 shape factor which is greater than about 10.

33. A particulate filler material according to claim 32, wherein the non-clay
mineral flame retardant component is selected from phosphorus-containing
compounds, boron-containing compounds, metal salts, metal hydroxides, metal
30 oxides, hydrates thereof, halogenated hydrocarbons, and any combination thereof.

34. A particulate filler material according to claim 32 or claim 33, which consists
essentially of ATH and the particulate non-kaolin clay mineral, and optionally one or

more other non-clay mineral flame retardant component, with less than about 10% by weight of other component(s).

35. A particulate filler material according to any one of claims 31 to 34, wherein
5 the particulate non-kaolin clay mineral is a talc.

36. A particulate filler material according to claim 35 further comprising an organoclay.

10 37. A process for forming the polymer composition as claimed in any one of claims 1 to 26, which comprises mixing the components of the composition, the polymer component being present as liquid or particulate solid, optionally as one or more precursor(s) of the polymer component.

15 38. A mixture of a particulate filler material as claimed in any one of claims 27 to 36 and a polymer or a precursor thereof in the form of a liquid or particulate solid.

39. An article formed from a flame retardant polymer composition as claimed in any one of claims 1 to 26.

20 40. A sheath, coating or housing for an electrical product, formed from a polymer composition as claimed in any one of claims 1 to 26.